



EUROPEAN COMMISSION

**5th EURATOM FRAMEWORK PROGRAMME 1998-2002
KEY ACTION : NUCLEAR FISSION**

Learn Safe

LEARNING ORGANISATIONS FOR NUCLEAR SAFETY

CONTRACT N° FIKS-CT-2001-00162

THE PATH TO A NEW ORGANISATIONAL STRUCTURE

Björn Wahlström, VTT Industrial Systems

Carl Rollenhagen, SwedPower AB

Lennart Wallin, OKG Aktiebolag

Edward Dunge, OKG Aktiebolag

8.12.2003

Summary: The present report gives an account of thinking within OKG AB, which led to a large organisational restructuring of the company. This report was written about one and a half year after the organisational change, which gave a possibility to assemble some of the initial lessons from the organisational change. The intent of this report is to share some of the generic lessons from the organisational change with the partners in the LearnSafe project. This report has been preceded by more specific reports written in Swedish from interviews and organisational surveys. The experience from the organisational change is largely positive, but some fine tuning of organisational functions have still to be done.

List of content:

The path to a new organisational structure.....	1
1 Introduction	3
2 Background	3
2.1 The Oskarshamn site	3
2.2 Early organisational structures in Oskarshamn	4
2.3 Rethinking organisational structure	4
2.4 A common maintenance organisation	5
2.5 Setting goals for the new organisation	6
2.6 Preparing for the organisational change.....	6
2.7 Building the new organisation.....	7
2.8 Regulatory notification.....	7
3 Components in an organisational structure	7
3.1 The plant owner organisation	8
3.2 The resource organisation	8
3.3 Co-ordinators and contact persons	8
3.4 Special responsibilities	9
3.5 Safety reviews and inspections	9
3.6 Groups and meetings	9
3.7 Deputies and substitutes	10
3.8 Strategic and annual plans.....	10
4 The organisational survey	11
5 Experience from the organisational change	11
5.1 A general impression.....	11
5.2 Some specific improvements	12
5.3 Some difficulties	12
5.4 Process orientation in work activities.....	13
5.5 Safety assessments, reviews and inspections	13
5.6 Some remaining issues	13
6 A discussion	14
6.1 The organisational structure	14
6.2 Components of organisational design	14
6.3 Authority and responsibility	15
6.4 Organisational efficiency and flexibility.....	15
6.5 Organisational compartmentalisation.....	16
6.6 A dual loyalty	16
6.7 Adapting the load on resources	16
6.8 The informal organisation	17
6.9 Regulatory oversight	17
7 Conclusions	18
Appendix 1. Typical questions asked during the interviews.....	19
Appendix 2. Questions in the organisational survey	20

Disclaimer: This report has been prepared by four individuals from three organisations. Because the report has not gone through a formal review process the thoughts and opinions expressed do not necessarily reflect the opinion of VTT, SwedPower AB and OKG AB.

1 INTRODUCTION

The Nordic electricity market was deregulated in steps during the 1990ies. The years after the deregulation was characterised by a surplus of hydro power in the Nordic system, which lead to very low electricity prices. Consequently the operators of nuclear power plants in Sweden and Finland had problems to compete on the market. The new situation initiated various activities, which were aimed at decreasing operating, maintenance and administrative costs at the nuclear power plants. This was also the situation at OKG AB.

In a consideration of the new situation at OKG AB it became evident that a sustainable position on a deregulated market required innovative thinking in how work activities should be organised to match economic realities with the high requirements on an endurable safety. Furthermore the Swedish regulator SKI has announced the introduction of new safety requirements, which are likely to introduce additional investments in modernisations of the plants at the Oskarshamn site.

The present report gives an account of thinking within OKG AB, which lead to a large organisational restructuring of the company together with experience from the process of implementing the new organisation. This report was written about one and a half year after the organisational change, which gives a possibility to assemble some of the initial lessons from the organisational change. In the discussion part of the report, lessons learned are placed into a frame of what is more generally known about people and organisations.

The intent of this report is to share some of the generic lessons from the organisational change at OKG AB with the partners in the LearnSafe project. This report has been preceded by more specific reports written in Swedish from interviews and organisational surveys that are referenced in the report. These reports were written as a part of the response to a regulatory letter from the Swedish regulator SKI in which more detailed information on the organisational change at OKG AB was asked for.

2 BACKGROUND

This chapter gives a brief history and background of organisational changes that were carried out at the Oskarshamn site during the period of 1999-2003. In the change process a novel organisational structure was introduced and implemented. Early experience from the suggested structure was obtained in the reorganisation of the maintenance department at the Oskarshamn site.

2.1 The Oskarshamn site

OKG AB operates three BWRs at the Oskarshamn site (cf. Table). The three units are of different generations delivered by Asea Atom (presently Westinghouse Atom) in Västerås, Sweden. O1 was the first electricity producing nuclear unit to be taken

	O1	O2	O3
power (MWe)	465	630	1200
start of construction	1966	1969	1980
start of operation	1972	1975	1985

into operation in Sweden, O2 is one of the five units considered to be the first generation of the Swedish reactors and O3 together with its sister plant F3 at the Forsmark site are the most modern of the Swedish nuclear power plants. In addition to the three nuclear units, the Oskarshamn site also has the central storage facility for spent fuel, CLAB, which is operated by

SKB, the Swedish company responsible for implementing the final repository of high level nuclear waste in Sweden.

One activity that has put its mark on the whole Oskarshamn site has been the recent modernisation of the oldest unit O1. This modernisation was initiated as the response to some deficiencies of the plant as compared with modern standards, which were detected after the strainer incident at the Barsebäck plant in 1994. The modernisation has been a very large undertaking by OKG AB and it was completed in the year 2002. The modernisation was conducted in two steps of which the first one aimed at merely correcting the most obvious deficiencies and the second to bring the O1 unit at parity with the newest units. The later step in this modernisation project has among other changes brought in a completely new modernised computer based control room.

2.2 Early organisational structures in Oskarshamn

The start up of the two first units O1 and O2 were relatively close in time and in the beginning they were operated within one organisation. The third unit O3 came later and it was staffed mainly with newly hired personnel. A slightly different operational culture evolved therefore at the third unit. In the late 1980ies each of the three units were formed to be result organisations within the OKG AB and the operational cultures at the three units took slightly divergent paths.

During the 1990ies the organisation in Oskarshamn was unit oriented. This was natural because of their technical differences. The position of the three units as result centres in OKG AB brought a friendly competition between them and fostered a lot of innovations. The unit structure gave also the benefit of a clear line of command and reporting with a good possibility to benchmark various work processes between the three units. At the end it may even be claimed that the three units had developed almost to separate companies within the mother company.

The safety oversight was during the 1980ies integrated in the operation of the units with a small central safety office. This situation changed in the 1990ies, when new Swedish regulation implied the formation of an independent safety department. According to the new regulation safety assessments and reviews were assumed to be carried out in two steps of which the primary step was to be carried out within the line organisation of the units and the final step within the independent safety department. Regulatory inspections and reviews could therefore concentrate more on ensuring that the independent safety assessments and reviews were properly conducted.

Although the organisation at the Oskarshamn site was unit oriented there was a central technical support organisation within OKG AB already during the 1980ies. The division of resources between the units and the central organisation has however varied somewhat over the years. The allocation of resources from the centrally placed technical support to the three units was since the end of the 1980ies arranged through a buy-and-sell system, where operations bought services from the technical department. This arrangement provided an additional benefit of creating a better cost conscience within the whole organisation.

2.3 Rethinking organisational structure

The division of OKG AB into three parallel organisations made it gradually evident that there was a need for more unified working practices between the units. A compartmentalisation between organisational units could be observed and it even sometimes became difficult to achieve a smooth flow of work over organisational borders. There were also overlaps in the

unit organisations and many expert groups were under-sized. The deregulation of the electricity market in Sweden had also demonstrated that a sustainable safe and economic operation implied a higher efficiency in activities. Reviews had furthermore pointed to some needs for organisational development at OKG AB. The response created by the senior management was a vision of a new OKG, which also contained the proposal of an organisational restructuring of the whole company.

The vision of the new OKG was built on values such as customer orientation, safety consciousness, foresight, commitment and efficiency. Further components in the restructuring were the introduction of process orientation in work activities, the formation of competency centres, increased possibilities for the personnel to influence their own development and an enlightened leadership on all levels in the organisation. It also became evident the necessary organisational change had to be implemented in steps. In the organisational change some modest down-sizing of the organisation was also implemented.

One important component in the move to a new organisational structure was an internal discussion of the division of responsibilities for the facilities and for the personnel. A common observation over the years had been that some managers tended to be more technically oriented, where others were personnel oriented. This observation brought forward the proposal to split the responsibility for the facilities and for the personnel to two different persons. This suggestion actually becomes the leading principle of the organisational restructuring. The solution was viewed to give plant managers a possibility to put focus on the facilities and the resource managers focus on competency development of the personnel.

2.4 A common maintenance organisation

The first step towards the new organisational structure was taken with the formation of the common maintenance organisation for the whole Oskarshamn site. Before the reorganisation the maintenance was divided into four departments, one for each of the units and one for common activities for the whole site. In the reorganisation four new units were formed of which two were operational and two took care of supporting activities. One of the operational units concentrated on mechanical maintenance and the other on electrical and I&C maintenance. One of the support units concentrated on methods and the other on services.

In the introduction of this structure it was considered to be necessary to establish the position of a maintenance co-ordinator for each of the units. The responsibility of the maintenance co-ordinator was to define maintenance needs for the units and to negotiate with corresponding maintenance managers on work activities to be delivered.

The new organisation brought in a centralisation of all maintenance activities at the Oskarshamn site, where people were supposed to work on all units. The technical differences between the three units made it however practical that most of the people had their own unit of specialisation. There were some minor cuts in total maintenance staff and the first steps to a new process oriented way to work were taken. The new maintenance organisation was taken into operation at the end of the year 2000.

The successful restructuring of the maintenance department provided support for the larger restructuring of the whole organisation of OKG AB. With the understanding that the organisational change this time would be far larger and influence the whole organisation it was considered necessary to do a careful preparation and anchoring of the proposed concepts with the staff.

2.5 Setting goals for the new organisation

The overall goal for the organisational change was set to secure a long term and sustainable development of the business with a high availability and safety of the facilities. Furthermore the organisational change aimed at an increased focus on the core business and at creating a holistic view of all activities within the company. A specific goal was to combat the tendency to have three companies within OKG AB. Ensuring proper preconditions for maintaining necessary staffing and competency was also considered to be an important objective for the reorganisation.

These goals were further concretised through a number of sub goals such as creating preconditions for achieving a larger similarity in work practices and prioritisation. Further it was stated that managers should be given better possibilities to focus on the development of technical areas and personnel competency. Actually it was assumed that the personnel should be given the prerequisites to work for a continuous improvement. A stated goal was also that it should be enjoyable to work at the Oskarshamn site. Finally the economic goal of the organisational change was to reach a certain level for operational, maintenance and administrative costs.

Achieving these goals it would be possible to get a more even loading of personnel at the three units by at demands move personnel over the unit borders. One goal in the organisational restructuring was also to have people out at the units regardless of their formal placement in the organisation and to move people only when a clear benefit could be seen.

2.6 Preparing for the organisational change

It was evident that the organisational change needed a large anchoring operation within the whole OKG AB to be successful. At the same time the senior management recognised the need for an open discussion of possibilities to create more efficient working practices within all functions of the company. The solution was to invite a large group of people to open discussions of the best ways to organise for the future. For that purpose some 120-130 persons in various professions responded to a call for participation in these discussions.

The discussions were carried out in nearly 20 different working groups. The working groups were given the tasks to take look at activities within a certain group of professions and to produce a report describing the present organisation of work together with a suggestion for how it should be organised in the future. Some of the suggestions were implemented almost unchanged and other required larger modifications before they were implemented in the new organisational structure.

The preparation for the organisational change included a planned follow up of the success of the organisational change through measurements of the attainment of important goals. Some of these were assumed to be carried out through normal quality audits and reviews, but also some more targeted assessments and reviews were planned.

One part of the preparation was connected to the actual organisational change over. To ensure that no tasks would lose its owner in the transfer from the old to the new organisations, everyone was asked to list his or her tasks in a short report to make it possible to check that they were properly transferred to the new organisation. Experience shows that this process was largely successful.

2.7 Building the new organisation

One objective in the organisational change was to enhance a larger mobility between organisational units, because broad skills were seen as one crucial component in preparing for the future. Another component was to treat the whole personnel equally in a very transparent manner. These objectives led to the selected procedure of requiring that everyone would apply for a position in the new organisation. That call was initially extended to the managerial positions in the new organisation and it was followed with a similar call to the whole organisation slightly later.

When the new organisational structure gradually emerged, the first step towards its formal implementation was to appoint managers of departments and groups. When appointed they were then given large responsibilities to build up their own organisations around a specified mission and a set of tasks. In the appointment process psychological aptitude tests were used to some extent.

One important component in building up the new organisation was to rewrite the management and quality handbook to have everything in order for the date when the new organisation would take over. That date was initially set to be 1.5.2002, but it proved unrealistic to have everything ready then and the date of transfer was therefore set one month later. The organisational change was introduced at 1.6.2002 with one exception of the annual refuelling outages during the year 2002. They had been planned in the old organisation and it was therefore considered to be prudent not to change these plans.

2.8 Regulatory notification

Since 1998 SKI, the Swedish regulator, has required notifications in the case of large organisational changes. Such organisational modifications, which can affect conditions specified in the safety report as well as essential modifications to the report shall be reviewed accordingly. Before the modifications are introduced SKI shall be notified and can decide on additional or other requirements that shall apply.

OKG AB has responded to these requirements by issuing an instruction for making organisational changes. This instruction was extensively used in the planning of the organisational change and it resulted among others in two reports, one project report describing the whole process of organisational change and the other report taking stand on various risk connected to the organisational change to make a judgement on its justification.

OKG AB filed the notification on the upcoming organisational change in April 2002 and gave a few additional comments in June 2002. SKI responded in September 2002 asking for some additional clarifications. These clarifications were given to SKI in a short report that was filed in September 2002. SKI carried out a more detailed inspection of the organisational change as based on material supplied by OKG AB together with some additional information requested. This inspection was completed in November 2002 and caused SKI to request additional information from OKG AB. This information was filed to SKI at the end of March 2003.

3 COMPONENTS IN AN ORGANISATIONAL STRUCTURE

This chapter gives a more detailed account of components in the organisational change that was implemented in June 2002 at the Oskarshamn site. The organisational structure selected is based on two focal points, the facilities and the resources. This division was believed to give better possibilities for respective managers to orient themselves to their main task. The

new organisation is divided into a plant owner organisation and three main resource organisations.

3.1 The plant owner organisation

The split between two managerial responsibilities, one for the facilities and one for the resources has been the bearing principle of the reorganisation of OKG AB. This split implies that the ownership of the facilities is controlled by the plant owner organisation, which is served by the resource organisations at the site that is providing operations, maintenance and technical support for all the units. The plant owner organisation is to a large extent stripped from own resources.

The plant owner organisation comprises of one site manger, who has four unit managers, one for each of the nuclear units and one for the CLAB facility. The owner organisation has a planning unit that is responsible for operations and outage planning, to enable a co-ordination of the whole site regarding operation and annual outages. On the unit level the unit mangers do not have any own resources, but they have support from three co-ordinators from the resource units to get the resources they need. With a simplification the task of the plant owner organisation is to define what shall be done and when it should be done.

3.2 The resource organisation

The resource organisation is divided into operations, maintenance, technical support, safety, environment, finances, personnel and communication. The assumption is that the unit managers request the resources they need from the corresponding resource organisation. This also contains the assumption that when there are conflicts between the resources needed at different units, they will be resolved within the owner organisation at the level above the unit managers. This makes it easier to set the priorities between the units that reflect their capabilities. The resource organisation is responsible for maintaining and developing the competency of their personnel, which creates a possibility for better co-ordination and use of common tools.

In a consideration of roles as compared to the plant owner organisation one may say that the resource organisations are responsible for how things should be done and who is doing it. More accurately the resource managers are responsible for resource planning and development. The resource managers have in their organisation various specialists that are responsible for the development of work methods and tools. The division between plant owner organisation and the resource organisation should not be seen as a division between the two functions buy and sell, but instead as two different views that are co-ordinated by the support of co-ordinators.

3.3 Co-ordinators and contact persons

In order to create an interface between the plant owners and the resource organisations the positions of co-ordinators and contact persons were created. This concept of co-ordinators was introduced already in the formation of a common maintenance organisation for the Oskarshamn site and it was extended correspondingly into the new organisation. Three different co-ordinators are used at each of the three units and for the CLAB facility, i.e. operations, maintenance and technical co-ordinators. The co-ordinators have their superiors in the resource organisations, but they do their daily work in close co-operation with the unit managers. The co-ordinators are supposed to know what the unit managers need and they administer the assignments to the resource organisations. To ensure a proper flow of information the co-

ordinators are participating in the management groups of both their units and their resource organisations.

The contact persons are responsible for maintaining contacts to the resource organisations that have no specific co-ordinators. This means that there are contact persons for environment, finances and safety support. The task of the contact person is to know what the unit managers want to be done and they administer the assignments that their corresponding resource group is assigned to do.

3.4 Special responsibilities

In the organisation there are certain authorities and responsibilities connected to nuclear safety that are defined explicitly. The responsibility for the facilities involves the responsibility for their operation together with predictive and corrective maintenance and it is placed in the plant owner organisation. Operational authority and responsibility is defined in regulatory guides and is also located in the plant owner organisation. The safety responsibility with all its implications is for each of the units born by its unit manager.

The responsibility for maintaining and developing the quality system of OKG AB is placed on the unit for safety and quality. The responsibility for the personnel is placed on the managers of the resource units, who also have the responsibility for the working environment. The responsibility for issuing, reviewing and approving of operational instructions is placed on the manager for operations. The unit managers are responsible for the issuing, reviewing and approving the facilities safety technical specifications. The responsibility to ensure that the safety analysis reports for the facilities are updated relies on the plant owner organisation, but the actual work of updating is done within technical support. Finally the responsibility for the physical protection is borne by the plant owner organisation.

3.5 Safety reviews and inspections

The reorganisation caused only few changes within the area of safety reviews and inspections. The concentration of resources brought some new more operational tasks to the safety and quality department, which are connected to guards and preparedness. These tasks are decoupled from the independent safety review, which is the main task of the safety and quality department within OKG AB.

The primary safety reviews of plant modifications and other similar safety related activities is laid on the plant owner organisation. This implies that the respective resource organisations are bringing their own inputs to the forming of a comprehensive safety view that is the responsibility of the plant owner organisation. In forming this view the plant owner organisation can call on support from specific persons within the technical support organisation. These persons are supposed to be generalists and able to support unit managers in various issues connected to plant safety and regulatory issues.

The safety and quality department is as before the reorganisation responsible for the independent safety reviews as required by Swedish regulation. It is also responsible for the contacts between OKG AB and the Swedish regulatory bodies.

3.6 Groups and meetings

To support information flow within OKG AB there are many formally defined groups with regular meetings. The most important is the senior management group, which is chaired by the CEO. All resource units as well as the three power plants and the CLAB facilities have

their own management groups with meetings every second week during normal operations. In addition there are various standing groups to handle operational issues, where a co-ordination between operations, maintenance and technical support is needed. One group is assigned to carry a follow up on various project activities within OKG AB.

The senior management group is supported by various preparation groups that produce reports and other material to support decision making. These groups are established on an ad hoc basis and they typically consist of three members of the senior management group together with experts and specialists as needed.

The safety committee is another group that has an important role in taking stand on various events and incidents both at the own units and in a more global context. The safety committee of OKG AB is manned with both internal and external experts and managers with a long experience from the nuclear field. Regular meetings in the safety committee are held once a month.

The most important operational meeting is the morning meeting at the units. This meeting is typically chaired by the operations co-ordinator and it goes through all operational events during the last 24 hours and takes a look on upcoming tasks during the next 24 hours. The weekly operations meetings at the units are chaired by the unit manager and it takes similar looks at the last week of operation and the tasks of the incoming week.

3.7 Deputies and substitutes

The organisation at a nuclear power plant should be able to provide a 24 h service 7 days a week on a continuing basis. This has brought the need for having appointed deputies and substitutes. In deciding between different alternatives, there are two considerations to be made. On one hand one would like to have the deputies or substitutes to be at the same organisational level as those persons they substitute. This may on the other hand imply that they are more distant from the day to day activities at the unit, where they are supposed to act as deputies or substitutes. On the other hand a person better oriented with these activities may not have the organisational status, which is required from a deputy in that position.

In making these appointments a common practice has evolved at OKG AB was to appoint the deputies or substitutes from the same level as the person they are substituting. It may in the future be necessary to deviate from this straightforward practice on a case-by-case consideration.

3.8 Strategic and annual plans

The strategic and annual plans are important instrument in the control of work activities. The strategic plan takes an outlook several years into the future to identify important goals and the work activities needed to reach the goals. The annual plan forms the basis for budgeting and reporting on a yearly basis. The annual plan can also be seen as a kind of contract between the units and the resource organisation.

The strategic plan is intended to give a general frame for the planning at all organisational units. This includes major needs for plant modifications and planned modernisations. It also includes the identification of changes in staffing and competency profiles.

The annual plans for the units are developed in close co-operation between the unit managers and the operations, maintenance and technical support co-ordinators. The unit plans are inte-

grated in the plant owner organisation to become the annual plan of OKG AB and it is further refined and approved in the senior management group.

4 THE ORGANISATIONAL SURVEY

One important component in the plan to introduce the new organisation was to collect views and experiences on how the goals defined before the change have been fulfilled. This process has not yet been fully completed, because some of this information was planned to take part in the regular programmes of assessing the organisational climate and the safety culture within OKG AB. One more restricted survey was however performed during the year 2003 to assess views on how the reorganisation has influenced activities connected to nuclear safety.

This survey was directed to the whole personnel of OKG AB and it contained 28 questions with five response alternatives and two open questions. The response rate was 74%, which can be considered satisfactory for conclusions to be drawn. The questions in the survey are given in Appendix 2. One important component in the interpretation of the results from the survey was connected to a definition of criteria for evaluating the results. These criteria was qualitative, but anchored to numerical values as obtained and they were interpreted to indicate that the new organisation gave better, as good or poorer support in the organisational safety as compared with the old organisation.

A general interpretation of the results of the survey is that additional efforts are needed to clarify the organisational structure to ensure that people understand roles, authorities and responsibilities. When this clarification has been achieved it is likely that also other smaller improvements will be obtained.

5 EXPERIENCE FROM THE ORGANISATIONAL CHANGE

This chapter gives a general overview of the experiences collected with the new organisation. The discussion is based on interviews and discussions conducted within OKG AB at two instances of time, the first during the preparation of the organisational change in the spring of the year 2002 and the second about one year later after the implementation of the organisational change.

5.1 A general impression

The general impression of the organisational change one and a half year after its implementation is positive, but there are also things that still need to be improved. One reason for this generally positive view is most likely the involvement of a large percentage of the staff in the preparation of the organisational change. Many of the respondents in the discussions reported an involvement of people and willingness from the organisation to listen to suggestions.

There were some initial fears that the plant owner organisation in its absence of own resources would have been left as a torso without possibilities to influence its own fate. This fear has evidently not become true and in practice the unit managers actually may have better possibilities now to ensure an availability of the best resources.

The co-ordinators got an important role in making the new organisational structure functional. Very experienced persons were selected for the positions and there seems to be a satisfaction with the way they have taken up the new roles. In the interviews there were for example given several cases of a very efficient handling of urgent matters through the intervention of the co-

ordinators. In spite of these positive remarks there seems however still to be work to do in clarifying the authorities and responsibilities of the co-ordinators.

Organisational change always involves the problem with two organisations in operation for some restricted period before and after the change. There was not enough time to update the management system in its entirety and sometimes there were things intentionally left open. In addition people have a tendency to step back to old and familiar practices, when some confusion with the new way to work arises. These phenomena have been seen in Oskarshamn, but there has also been a clear commitment by managers at all levels to make the changes persistent and functional.

5.2 Some specific improvements

In the interviews and also in other assessment there have been some clear improvements of earlier practices introduced with the new organisation. The most important is that the stated goal to make it possible for the unit managers to put their focus on the facilities seems to have been fulfilled with the new organisation. The internal co-ordination of resources for the units at the Oskarshamn site seems also easier to achieve in the plant owner organisation as compared with the earlier balance between three result managers.

It is very clear that the new organisation has created a platform for a harmonisation of practices between the three units. To some extent it may be said that this harmonisation has been somewhat slower than expected, but many persons expressed a satisfaction with the development. On the other hand there are still tendencies to be seen of people falling back in the old roles they had before the reorganisation. One important mechanism in pursuing a larger unification of work practices has been the regular meetings between the co-ordinators, which have made it very much easier to act together on various initiatives.

In the old organisation it sometimes proved very hard to find an organisational consensus on certain technical solutions. To some extent this was connected to the technical differences between the units at the Oskarshamn site, but it was also triggered by strong views held at the units on the superiority of certain technical solutions. This problem seems to have moved away completely and several examples of decisions looking to the benefit of the whole company were given.

5.3 Some difficulties

In spite of the largely positive view on the organisational change there are evidently places where additional tuning has to take place before a full success can be claimed. One impression from the interviews was that OKG AB sometimes seems to have difficulties in generating a timely reaction to outside demands. This problem apparently has been there already before the introduction of the new organisation, but its resolution seems to require additional analysis and actions.

In the organisational change there seems to have been a few organisational units, where the preparations in defining mission and tasks were not brought to the necessary detail. This is typical for most organisational changes, but it implies that the senior management should have an eye and an ear for such problems to initiate timely reactions. These problems have now been addressed with some small changes and clarifications as a result.

There were some complaints regarding the availability of information on the organisational change, but this again seems to be a common complaint in all organisational changes and not very much depending on the actual amount of information made available during the process

of change. The need to reduce the personnel slightly during the organisational change may also have increased the number of these complaints.

In OKG AB, as at other organisational change processes, there seems to be a large spectrum of attitudes. A large group of the personnel was very positive to the change and took part in all stages of the preparation with a large enthusiasm. The majority however did not take a firm stand neither on a positive nor on a negative side of the issue. Finally a relatively small percent was very negative to the whole organisational change. In a few cases these negative attitudes were that persistent that it was considered necessary to move these persons to other duties.

5.4 Process orientation in work activities

The plans of OKG AB called for two steps in the organisational change of which the first step was the structural change that was implemented at 1.6.2002. The second step was a move towards a larger process orientation in all work activities that was assumed to be implemented more gradually after the first step. It appears that the expectations within the personnel on this second step were larger than what actually was seen during and after the organisational change. One reason may be that the organisational change itself took that much resources that less urgent activities were given a smaller priority.

On the other hand the process orientation in the work activities has been implemented in a very natural way in the harmonisation of work practices between the units. This development process is still ongoing and it has already introduced savings in resources and somewhat decreased the total number of instructions at the Oskarshamn site. A company wide instruction could actually in one sense be seen as describing a process and the owner of the instruction could then be seen as the process owner. It may also be noted that process orientation in the sense of streamlining several interconnected activities for an optimal performance has taken place since the beginning, but without the use of this concept.

5.5 Safety assessments, reviews and inspections

With the new organisation some proposals were discussed for changes in how safety assessments, reviews and inspections should be arranged. One of these discussions is connected to the daily assessment of operational safety. They are as before done at the daily morning meetings, but if the meeting is chaired by the operations co-ordinator he should have a formal role in the line of operational responsibility from the CEO to the shift supervisors.

Another change is that the unit managers do not have their own staff to support them with more detailed reviews and inspection, but have to get these resources from the support organisations. This has not been considered to cause problems, because they have the necessary competency available in a far larger pool of experience within the whole OKG AB. This is certainly true, but it would require planning at the resource units of how resources are utilised to avoid that the same persons inspect work in which s/he has been involved in doing.

5.6 Some remaining issues

After every organisational change there are always some remaining issues that require fine tuning. One of these issues is the planning function, which presently is located within the plant owner organisation. It seems that the interface between the planning and the resource organisations sometimes is hampered with remains from earlier power structures and therefore is not flexible enough to cope with the new demands.

The formation of various working groups seems in the wake of the new organisation to have happened often on a rather ad hoc basis. In order to maintain an overview of on-going activities it may be necessary to straighten this procedure with a clear definition of the task to be done, the responsible manager who has the responsibility to overlook the group and to report further up on its achievements.

6 A DISCUSSION

This chapter is based on a more general reflection of the organisational change at OKG AB upon more general issues of management and organisation. At the same time the discussion makes an attempt to point of important dimensions of organisational design with the hope that these can be helpful when other nuclear power plants enter organisational changes.

6.1 The organisational structure

The organisational structure adopted at OKG AB does not seem to have any similarities within the nuclear industry elsewhere. In the conventional industry there are more examples that can be used as a paragon. Due to the novelty of the organisational structure it seems that it sometimes has been difficult to convey an understanding of the new roles and responsibilities to people outside OKG AB. It is evident however that there has been an increasing complexity in the task of managing nuclear power plants to account for new demands and requirements set by the society. This complexity can only be met by an organisation that itself is more complex.

Another argument against the new organisational structure at OKG AB is that it may diffuse the responsibility of people when they are forced to balance between demands set by the plant owner organisation and the resource organisations. It is clear that the new organisational structure places higher demands on the personnel for initiative and self-management, but demographic changes in the society makes it likely that people will expect more empowerment than a traditional hierarchical structure can give. On the other hand it is clear that future managers have to be able to create solutions for both people who like the challenge and for people who do not.

6.2 Components of organisational design

OKG AB has in the organisational change process taken stand on many components of organisational design. The perhaps most important is authority and responsibilities as defined in the organisational structure. In the organisational structure there is an identification of the need for both breadth and depth in competency, where the plant owner organisation becomes a natural home for generalist. The resource organisation provides similarly a natural home for various specialists.

One important component in organisational design is to provide various fora for communication. There are many meetings taking place at the Oskarshamn site and they seem to have clear participation and agendas. The time intervals between the regular meetings in the groups also seem to be well adapted to the issues discussed.

In nuclear power operation one can separate between two different modes of operation, normal operation and disturbances. During normal operation there is a continuous search for efficiency and the interaction between the unit managers and three co-ordinators seem to provide a good basis for integrating the experience of these four persons for the best result. During various disturbances the main task is not efficiency but safety and it is then necessary to be

able to call in expertise on a short notice. Also in this respect the new organisation has several advantages as compared with the old one.

The location of offices is also an important component of organisational design. A physical location near to each other can increase informal communication and therefore also organisational learning. The organisational structure with the plant owner and the resource organisations makes the decision of the location of offices somewhat tricky, because people should on one hand be near to people they work with at the units and near to they resource groups on the other. In an assessment of how OKG AB it seems that a reasonable compromise between these two views has been achieved.

6.3 Authority and responsibility

Authority and responsibility are drivers of commitment and initiative. The allocation of authority and responsibility is always a tricky process in all organisations. It is important that all important tasks and activities gets one person who is responsible for them, but a shared authority and responsibility has a tendency to stifle initiative. In nuclear organisation the need to define authority and responsibility in a clear and transparent way is well known, but still there are examples of uncertainties in this regard, which have introduced misunderstandings and tensions in the organisations.

Authority and responsibility is also connected to the delegation of certain tasks and activities from superiors to subordinates according to the line organisation. In the process of delegation it is important to remember that it can be seen as a contract between two parties, where both have to understand what is delegated. This expectation may not be explicitly communicated and/or it may not be within the repertoire of actions of the person who gets the delegation.

Another difficulty seems to be too separate between a delegation and giving an assignment. A delegation assumes a responsibility for the tasks and activities that have been delegated. In an assignment the responsibility usually is viewed to be restricted to completing the assignment within the allotted time and according to defined quality standards. An assignment lays the responsibility on the superior and s/he has to inspect that the assignment has been completed to satisfaction.

6.4 Organisational efficiency and flexibility

One important goal in the organisational change was to increase organisational efficiency and flexibility. It is evident that combining several parallel support units into single organisational units has the potential for a larger efficiency through standardisation of various work activities. Larger resource units can also more easily achieve a larger stability in the load on resources. Bringing people together that have the same job profiles makes it easier to maintain and develop their competency.

Organisational efficiency and flexibility relies on an efficient communication. Meetings are one important component in ensuring communication, but they have to balance the need for dialogue and information with an efficient use of resources. Another component in communication is connected to the distribution of documents. OKG AB has as many other nuclear power plants introduced an Intranet to provide the necessary facilities for e-mail and to give access to documents and other information. This development has been going on independently of the organisational change, but these functions showed to be important in its implementation.

The balance between formal and informal work practices is important when efficiency and flexibility is searched for. Clear prescribed ways to execute certain tasks can ensure efficiency and stability, but there should be the flexibility to search for improved ways to work. Informal routines may in some case make the work more flexible, but for the more important tasks it is advisable not to let formal and informal practices to diverge too much.

One important component in getting efficiency and flexibility work routines is to be able to plan them to a reasonable degree of accuracy. This has also the benefit of decreasing uncertainty connected to future loading on resources. This issue has also to do with the need to set priorities and allowing upcoming tasks to be started with a sufficient lead time.

6.5 Organisational compartmentalisation

One of the goals was to decrease the organisational compartmentalisation that had been seen in the old organisation. One comment from the time before the organisational change was that it seemed to be easier to maintain contacts to the outside of OKG AB than within the company. Discussions with key persons after the organisational change indicate that this goal has been reached at least to the extent that many new contact channels have been created within the organisation. It remains to be seen if these channels will make earlier communication channels to fade with time.

One of the driving forces towards an organisational compartmentalisation is evidently connected with the human desire to have something own to be proud of and a feeling that something outside this inner border should be looked at with suspicion. To some extent one may assume that the choice of external partners rather than internal may be fuelled by a feeling of internal competition. This feeling is sometimes correct especially when managers use competition between organisational units as a mover towards efficiency. In one respect one may associate the positive aspects of compartmentalisation with the concepts of ownership and commitment.

6.6 A dual loyalty

One problem with matrix organisations is that it creates the need for a dual loyalty. In the new organisation at OKG AB the co-ordinators have the most outspoken dual loyalty towards to plant owners and the resource managers. Asked about problems in this regard none indicated problems with this dual loyalty, but instead thought that the position gave them an exceptionally good possibility to interact in a positive way with both organisations.

The same dual loyalty to the unit in consideration and to their resource organisation is found also in the operations and in the maintenance units. In practice this seems not to cause problems, because the unit is as before the secure home port, but with the possibility that they occasionally are asked to support activities on some of the other units. This arrangement does however dilute the traditional relationship between the managers of the resource units and their subordinates, because much of the detailed planning of tasks and work activities are agreed on between the unit managers and the persons directly.

6.7 Adapting the load on resources

The possibility of an excessive load on resources has created regulatory concerns in some countries and it is clear that a continuous overload can cause a deterioration of performance. There are two ways to approach the loading on resources, one is to aim at a better predictability of future loads through planning and the other is to create flexibility through a larger pool of resources that can be called in at demand. Both strategies are in use at the nuclear power

plants, but there still seems to be large differences between nuclear power plants in the amount of unplanned work that is done. Additional flexibility in the loading on resources is also achieved through the use of consultants and entrepreneurs, but it may make it more difficult to collect and utilise experience from various work activities.

Unfortunately the changing environment for nuclear power has made it more difficult to find necessary competency in a long term. At the same time retirements impose threats to crucial competencies. OKG AB as many other nuclear power plants have therefore engaged themselves in competency surveys that also take a look on what can be expected demands on resources in the future.

6.8 The informal organisation

Any organisation can be viewed as consisting of two parts, one formal and one informal organisation. The formal organisation is the organisation that is described in organisational charts, management and quality handbooks, etc. The informal organisation is more intangible and hidden in the day-to-day practices. Discussions at OKG AB gave an indication that the informal organisation sometimes had a rather strong influence on how issues of various kinds were brought forward in the organisational change.

It is difficult to pinpoint and describe the informal parts of an organisation without an in-depth investigation, but also a shallow analysis can give some hints in this direction. In many organisations there seems to be a kind of old-guys network, which may or may not support the views of the present management. Organisations often also have a clear view of who can be considered as the best specialists in certain areas to form a kind of specialist network that is consulted when difficult issues have to be resolved.

Sometimes one may see practices and views that best can be expressed as a hidden power structure, which is not a part of the formal organisational structure. If the senior management is not reacting on such forms of maladies, it is even possible that conflicts may take the form of power struggles.

6.9 Regulatory oversight

Regulatory oversight in the case of organisational changes is a delicate task. Too much regulatory prescriptions on how to organise the work is likely to dilute the responsibility of the power utility. Similarly a too lax attitude to various changes the utility may propose, can foster a carelessness that may introduce later difficulties. A balance between these two extremes has to be found in the practical work connected to inspections, assessments and reviews.

One point of departure could be that the utility should be able to trust that any regulatory remainder is not aimed to conserve an old organisational structure, but are instead triggered by the wish of the regulator to understand reasons and arguments behind selected solutions. If for example the regulator is suspicious in regard to some specific solution, these suspicions should be articulated with arguments for why the solutions may not be appropriate. This would make it easier for the utility to react on concerns that indeed may introduce unnecessary risks.

Regulatory oversight should not per se be aimed at prescribing or forbidding certain solutions, but instead in ensuring that selected solutions are transparent and likely to achieve a good level of safety. It is equally clear that the regulator should not accept solutions without a reasonable evidence and proof. Especially if some proposed solutions disagree with what seems to be normal standards within the nuclear industry, they should be explained and ar-

gued for in detail. The regulator should also be able to have confidence in that the change process and possible problems are reported openly and honestly before, during and after the organisational change.

7 CONCLUSIONS

OKG AB made a bold decision in adopting an organisational structure, which have not been used in nuclear power plants before. There are no direct models in the conventional industry resembling the selected organisational structure, but this is also natural because it has been adapted to the operational experience collected at the Oskarshamn site. The special requirements placed on the nuclear power plants seem to be well reflected. In adapting to safety and efficiency demands set on the nuclear industry it is evident that there has to be organisational innovations and the organisational change at OKG AB can be seen as one step in this direction.

One fear with the new organisational structure at OKG AB was that conflicts could emerge in various interfaces within the organisation. This seems not to have been the case despite a few exceptions. Instead it seems that the new ways of organising has lead to an increased number of discussions related to something, which may be called constructive disagreements. This might be taken as an indicator of maturity of the personnel working at the Oskarshamn site.

One lesson learned from the organisational change at OKG AB is that more preparation and communication during the process would have made the change easier. On the other hand there is always a balance between costs and benefits of delaying the change and involving more people. One clear lesson is that large organisational changes will need both time and resources to be successful. Finally it has been seen that theoretical constructs can provide good ideas for structuring organisations, but they have always at some point of time to be adapted to the realities of one site and one organisation.

The experience from the organisational change is largely positive, but some fine tuning of organisational functions have still to be done. It will be interesting to see how OKG AB is able to face all future challenges of the nuclear industry, but at least discussions with people at the Oskarshamn site gives an impression of flexibility and depth in thinking, which gives good promises for the future. In a broad assessment of future challenges in the nuclear industry, one may say that the technical skills needed are expected to change less than the corresponding organisational skills. With its new organisation OKG AB can feel equipped to enter the new millennium of nuclear electricity generation.

APPENDIX 1. TYPICAL QUESTIONS ASKED DURING THE INTERVIEWS

The interviews at the Oskarshamn site followed the general outline as given below. Whenever interesting issues were brought up they were generally followed through. One important part of the discussion was also spent on establishing a good understanding of how the organisation is structured today and how different organisational units are working together.

1. Describe your involvement in the organisational change at OKG AB.
2. How has your job changed? Who is defining what you should do and when?
3. To what extent have people been adapting to the new organisation? Are the tasks and responsibilities clear?
4. How did the actual change process succeed? Were you personally involved in the preparations? Did you get enough information on how the new organisation was intended to function?
5. In the new organisation there are two types of responsibilities, one is connected to the facilities and the other to the personnel. Have you experienced any conflicts with this system of two types of managers that define what, when and how things should be done?
6. Have you been involved in responding to the regulatory concerns? What is your view on the ability of the unit managers to take their responsibility for the safety in the system, where they have to engage other organisational units to give them support? Do you see any problems in matching the competency that is needed at the units with the views the resource managers may have?
7. One of the goals with the organisational change was to introduce a larger similarity in how work is carried out on the units. To what extent have you been successful in achieving this goal?
8. What have been the most positive things with the new organisation?
9. In looking backwards, are there things you think that should have been done in a different way?
10. In conclusion, what is the feedback that you would like to give from your organisational change to your colleagues in Europe? What kind of do's and don'ts have you observed?

APPENDIX 2. QUESTIONS IN THE ORGANISATIONAL SURVEY

The questions 2-28 below aimed at a comparison between the state before with the state after the reorganisation.

1. How long have you been employed at OKG AB?
2. How do find the clarity in the tasks you do?
3. Do you have enough authority to carry out your tasks?
4. How would you assess the clarity of authorities and responsibilities within OKG AB?
5. How do you find the availability for you of personnel with appropriate competency?
6. What is your opinion on getting the time you need in your work?
7. What is your opinion on getting other resources you need (money, tools, etc.)?
8. What are your possibilities to get the information you need in your work?
9. What are your possibilities to reflect and follow up information, in order to make correct safety related decisions?
10. How well do you know that you send information to correct persons?
11. What is your opinion on the extent of the feedback that you get from superiors or principals?
12. What are your possibilities to complete work with a small risk for errors?
13. How would you judge the co-operative climate in your group?
14. What is your opinion about co-operation with other groups?
15. What are the prerequisites for your own development in your work?
16. What is your opinion on the influence of the work management on your possibilities to work safely?
17. What are your possibilities to question and criticise conditions that you perceive as non-safe?
18. What are your possibilities to influence conditions that you perceive as non-safe?
19. What is your opinion on the extent to which safety related questions get a satisfactory comprehensive and broad light?
20. What is the extent to which tasks at different units are controlled in similar ways?
21. What is your opinion on how the ambition to unify work practices has influenced safety?
22. What is your opinion on the extent to which the senior management group of the company prioritizes safety before economy?
23. What is your opinion on the extent to which your nearest superior prioritizes safety before economy?

24. To what extent is the senior management group of the company a paragon in regard to safety related issues?
25. What is your opinion on the extent of feedback of experience between the units?
26. To what extent are you aware of changes in the management system of the company?
27. What is your opinion on the need for additional efforts of the personnel beyond ordinary responsibilities to carry out safety related tasks in a safe way?
28. What is your assessment of the risk that safety related tasks fall between the responsibilities that are assigned to people?
29. Indicate important changes with a positive influence on safety that have emerged in the reorganisation.
30. Indicate important changes with a negative influence on safety that have emerged in the reorganisation.